Original Research Article

KNOWLEDGE AND PERCEPTION OF FEEDING STIMULATORS AMONG NURSING MOTHERS WITH INFANTS AND TODDLERS AGED 6 TO 24 MONTHS IN OLUYOLE LOCAL GOVERNMENT, IBADAN, OYO STATE, NIGERIA

ABSTRACT

Aims: This study assessed the knowledge and perception of feeding stimulators to enhance feeding among nursing mothers in Oluyole Local Government, Ibadan, Nigeria.
Study design: This study employed a cross-sectional design.
Place and Duration of Study: Primary Health Centres in Oluyole Local Government Area, Ibadan, Oyo State between October and December, 2020.
Methodology: We included 400 mother-child (6-24 months) dyads selected using a two-stage sampling process from eight Primary Health Centers. A structured questionnaire was used to obtain information on mothers' knowledge and perception of feeding stimulators.Knowledge of feeding stimulators was scored in percentages (≥50%=good knowledge and <50%=fair knowledge).Data were analyzed using descriptive statistics, chi-square test, and correlation analysis (α0.05).
Results: The average age of nursing mothers was 30.0±5.6 yearswith mainly secondary level of education (56.0%) and infants mean age of11.7±4.9. Notably, 75.5% of them were unfamiliar with the concept of feeding stimulants. Those who knew, did through self-discovery (13.5%), health workers (5.8%), family/friends (3.7%), or media (1.5%). Less than half (43.2%) of the respondents had good knowledge while 56.8% had a fair knowledge of feeding stimulators for complementary feeding. More than half of the nursing mothers agreed that feeding stimulation at a young age improved mental scores and long-term cognitive ability (58.8%), and the use of feeding stimulators such as toys, video games, and colours could assist children in acquiring valuable skills needed for academic achievement (57.1%). A very strong positive correlation (r=+0.962) was observed between mothers' knowledge and children's food intake.
Conclusion: There is a pressing need to raise awareness among mothers regarding the benefits of using feeding stimulators to improve children's intake of complementary foods, especially from health workers.

Keywords: Knowledge, perception, nursing mothers, infants, toddlers, feeding stimulators

1. INTRODUCTION

In the first few years of a child's life, proper infant feeding and healthcare are paramount for their growth and development [1]. Globally, breastfeeding is universally recognized as highly beneficial for both the nursing mother and the infant due to breast milk's reputation as the optimal nutritional source [2]. The latest guidelines for Infant and Young Child Feeding (IYCF) advocate for initiating breastfeeding within the initial hour after birth, exclusively breastfeeding infants up to six months, and subsequently introducing nutritionally appropriate and safe complementary foods with adequate frequency,

while continuing to breastfeed up to two years of age [3]. Feeding techniques play a pivotal role in a child's dietary intake, nutrient adequacy, and long-term dietary habits. This significance is so because children depend on others, particularly their primary caregivers, usually mothers, to feed them, influencing the formation of their dietary habits and determining what and how they are fed [4]. Furthermore, the family's role in how a child learns to feed, influenced by the methods or approaches employed by mothers or caregivers to stimulate feeding cannot be over-emphasized [5]. Early Childhood Development (ECD) establishes an essential basis for long-term health, overall quality of life, and sustained effectiveness [6]. Studies have shown that involving children in conversations at various developmental stages is more effective in controlling impulses as they grow older [7,8]. Additionally, interactive play with parents helps children acquire the skills necessary for future learning and adaptation. Providing children with toys like building blocks also enhances their reasoning abilities [8,9].

Infant stimulation involves activities designed to engage a child's senses (sense of sight, sound, touch, taste, and smell) [10]. Such stimulation enhances attention span, memory, and the nervous system, expediting a child's developmental milestones [10]. However, the extent of stimulation a child receives depends on both family structure and dietary practices. Studies have shown that early-life interactions between caregivers and children have both positive and negative impacts on nutrition, growth, as well as cognitive and social development [11,12]. Mealtime interactions between mothers or caregivers and children are characterized as either responsive, authoritarian, or passive, with the latter two representing non-responsive feeding styles. The responsive style is typically associated with the formation of healthy feeding practices and the child's ability to self-regulate their appetite [5]. Effective components of responsive feeding that promote food intake encompass responding positively to children through smiling, making eye contact, and using words of encouragement; feeding the child slowly and patiently with a good disposition; and being attentive to the child's signals of satiety [13]. The context in which feeding occurs must be considered in order to provide an environment conducive to healthy eating [14]. Creating a conducive environment for children involves ensuring their comfort, minimizing distractions, serving meals in an appropriate location, offering healthy food, and presenting it in an appealing manner to help children distinguish between various flavours and textures. Such an environment encourages healthy eating for everyone when meals are shared [15].

Adequate nutrition, care, and stimulation are therefore essential for a child's holistic growth and development [8]. Stimulation activities, whether through play or conversation, help children develop essential skills [8]. Systematic reviews have also highlighted the importance of combined approaches that integrate nutrition and caregiving interventions for the early-life development of children [16,17]. Therefore, parents of infants must possess the necessary knowledge to respond to their child's cues, fostering a sense of belonging and promoting the child's communication and social skills [7]. Successful feeding interactions also occurs when mothers effectively express their signs, and the children recognize and respond to them. Therefore, Promoting the use of feeding stimulators among nursing mothers is essential in enhancing children's food intake, and such practices should be encouraged. This study aimed to assess nursing mothes' knowledge and perceptions of feeding stimulators to improve feeding practices.

2. METHODOLOGY

This was a cross sectional study conducted among nursing mothers with infants aged 6 to 24 months attending Primary Health Centers in Oluyole Local Government Area, Ibadan, Oyo State, Nigeria. Oluyole has a population size of 290,800 and its headquarters is in Idi Ayunre town [18]. Previous study revealed that 85.8% of under-5 children were stunted, 89.8% were underweight and 66.6% were wasted in this study area [Majolagbe T.P. Lead City University, Nigeria, Unpublished results]. It has ten (10) wards with twenty-six (26) primary health care centres.

The minimum sample size for this study with 3% non-response rate was calculated as seen below [19]:

$$n = \frac{\mathrm{N}}{1 + \mathrm{Ne}^2}$$

$$n_0 = \frac{285900}{1 + 285900 \times 0.05^2}$$

$$n_0 = \frac{285900}{715.75}$$

$$n_0 = 399$$

$$Adjusted\ factor(k) = \frac{1}{1 - \mathrm{f}}$$

$$Adjusted\ factor(k) = \frac{1}{1 - 0.03} = 1.030927835$$

$$n = n_0 \times k$$

$$n = 399 \times 1.030927835 \approx 410$$

Where:

n_0 = The initial sample size

N = The study population area[2]

n = margin of error

f = estimated non-response rate

The stratified sampling technique (proportional allocation) was then used to select respondents in each primary health care centre.

$$\frac{n_h}{N_h} = \frac{\mathrm{n}}{\mathrm{N}}$$

Where:
N = The total population size in all the primary health care centres = 480.
n = The sample size = 410.
N_h = The total population size in each primary health centre
n_h = The sample size in each primary health centre
Two-stage sampling technique was used to select respondents from the primary healthcare centres. Eight (8) functional primary health centres were randomly selected from the twenty-six primary health centres in Oluyole Local Government. The respondents were selected from the eight primary health centres using stratified sampling technique (proportional) as shown in Table 1, based on the sampling frame (registers) in the primary health care centres.

Inclusion Criteria
1. Nursing mothers with infants andtoddlers between 6 months and 24 months.

Exclusion criteria
1. Nursing mothers with infants less than 6 months
2. Nursing mothers with toddlers more than 24 months
3. Pregnant mothers with toddlers less than 24months

Table 1: Sample size selected in each primary health centres Source: Primary Health Centres Record

S/N	Primary health centres	Population size per PHC	Sample size per PHC(n_h) $n_h = N_h \times \frac{\mathrm{n}}{\mathrm{N}}$ $n_h = N_h \times \frac{410}{480}$
1	Adaramagbo	110	$110 \times 0.854 = 94$
2	Odoonaelewe	110	$110 \times 0.854 = 94$
3	Agric	40	$40 \times 0.854 = 34$
4	Ayegun	40	$40 \times 0.854 = 34$
5	Idiayunre	40	$40 \times 0.854 = 34$
6	Ayetoro	60	$60 \times 0.854 = 52$
7	Ajofeebo	40	$40 \times 0.854 = 34$
8	Opeagbe	40	$40 \times 0.854 = 34$
		480	**410**

Due to incomplete responses from some of the questionnaires, four hundred (400) questionnaires were recovered from the field.The validity of the research instrument was measured using Pearson's Product Moment Correlation (PPMC) and each sub-scale was significant ($p<0.05$).The demographic factors, knowledge and perception information were analyzed using descriptive statistics while inferential statistics was used to determine the relationship between the knowledge of nursing mothers on feeding stimulators and food intake among children using Statistical Package for the Social Sciences (SPSS) version 20. In evaluating the knowledge of nursing mothers on feeding stimulators, a score (1) was given to every correct answer and zero (0) for inappropriate answers. The total scores were expressed as a percentage. A score that was greater than or equal to 50% was ranked as good, while scores below 50% were ranked as fair. Likert scale was used to measure the perception of the mothers on the use of feeding stimulators.Chi-square test was used to elucidate the relationship between knowledge, perception, use of feeding stimulators, and food intake.

3. RESULTS AND DISCUSSION

3.1 Demographic characteristics of nursing mothers

The demographic characteristics of nursing mothers are presented in Table 2. The mean age of nursing mothers was 30.0±5.6 years. Almost 94.0% of the nursing mothers were married while very few (0.3%) were divorced. More than half (56.0%) of the nursing mothers indicated that they had secondary education, 37.5% had tertiary education, whereas very few (2.3%) had no formal education. The result showed that most (44.0%) of the nursing mothers were businesswomen, followed by artisans (37.5%) and civil servants (16.3%). Similarly, less than half (46.5%) of the nursing mothers' husbands were businessmen, followed by artisans (25.3%) and civil servants (17.8%).

Based on monthly household income, results revealed that 65.3% of the nursing mothers earned between ₦30,000-100,000, 27.3% earned less than ₦30,000 while a few (0.3%) earned above ₦400,000. Results further showed that 59.0% of the nursing mothers resided in urban areas and less than half (41.0%) resided in rural areas. Furthermore, majority (60.7%) of the nursing mothers were multiparous while 39.3% were primiparous. Majority (34.5%) of the mothers had children 9-11 months, while 22.0% had children 12-15 months, and 21.3% had children 6-8 months. 46.5% of the mothers initiated breastfeeding within an hour after delivery, 27.0% initiated breastfeeding more than an hour, 20.8% initiated breastfeeding a day after delivery while very few (0.3%) initiated breastfeeding within 3 weeks and 2 days respectively.

Table 2. Descriptive statistics of demographic factors of nursing mothers (n = 400)

Variables	Frequency	Percentage
Age of respondents (years)	**30.0±5.6**	
15-25	98	24.5
26-35	239	59.8
36-45	61	15.3
Above 45	2	0.5
Marital status		
Single	19	4.8
Married	374	93.6
Separated/Divorced	6	1.5
Widowed	1	0.3
Level of education		
Primary education	17	4..3
Secondary education	224	56.0
Tertiary education	150	37.5
No formal education	9	2.3
Mothers' occupation		
Artisan	150	37.5
Business woman	176	44.0
Clergy	1	0.3
Civil servant	65	16.3
House wife	5	1.3
Student	3	0.8
Husbands' occupation		
Artisan	101	25.3
Business man	186	46.5
Civil servant	71	17.8
Clergy	8	2.0
Engineer	33	8.3
Student	1	0.3
Monthly household income (₦)		
<30,000	109	27.3
30,000 – 100,000	261	65.3
101,000 – 300,000	24	6.0
301 – 400,000	5	1.3
>400,000	1	0.3
Residence area		
Rural	164	41.0
Urban	236	59.0
Number of pregnancy		
Primiparous	157	39.3
Multiparous	243	60.7
Infant's age (months)	**11.7±4.9**	
6-8	85	21.3
9-11	138	34.5
12-15	88	22.0
16-20	65	16.3
21-25	24	6.0
Period of initiation of breastfeeding after delivery		

Within an hour	186	46.5
More than an hour	108	27.0
A day	83	20.8
3 days	14	3.5
A week	5	1.3
4 days	2	0.5
3 weeks	1	0.3
2 days	1	0.3

3.2 Knowledge of nursing mothers on feeding stimulators

The knowledge of nursing mothers on feeding stimulators is shown in Table 3. 75.5% of the mothers had no idea of what feeding stimulators were while 24.5% knew what feeding stimulators were. Out of the 24.5% that indicated that they had an idea of what feeding stimulators were, 12.5% explained that it involves the introduction of things like toys, cartoons that make a child willing or that entice the child to eat. Results further showed that most (13.5%) of the respondents got to know about feeding stimulators through self-discovery, health workers (5.8%), family members/friends (3.7%), and media (1.5%).

From the results of feeding stimulators adopted by respondents while feeding their child with complementary food, it was discovered that respondents sang rhymes for their child (66.3%), cracked their child up with jokes and smile (67.8%), had other family kids around because it made it easier for their child to accept the food (45.0%) and read the body signs of their child (66.8%) before introducing complementary food. On the other hand, 74.3% of the respondents did not throw toys at their child to gain their attention, 81.7% did not play video games for their child and 55.0% did not have any family kids around their child.

Furthermore, 84.8% of the respondents specified that the mechanism/tool used by them was effective whereas 15.3% stated that the mechanism used was not effective. Moreover, 73.5% of the respondents stated that the use of feeding stimulators would improve their child's intake of complementary foods with time. In addition, results showed that most (78.5%) of the respondents stated that rhymes would improve their child's intake of complementary foods with time, followed by toys (59.2%) and video toy games (46.5%). On the other hand, 84.8% of the respondents specified that other children around would not improve their child's intake of complementary food, followed by jokes (79.0%), colorful utensils (71.5%)

Overall, results showed that less than half (43.2%) of the respondents had good knowledge while 56.8% had a fair knowledge of feeding stimulators on intake of complementary food.

Table 3. Knowledge of Nursing Mothers on Feeding Stimulators

Variables	**Frequency**	**Percentage**
Idea of what feeding stimulators are		
Yes	98	24.5
No	302	75.5
If yes, kindly explain in your own term		
Methods you establish to attract a child to food in order to grow well and mentally sharp such as singing rhymes, smiling	17	4.2
How to make your child interested in food by playing	16	4.0
How you encourage your child to take food that enhances their growth	15	3.8
Introduction of things like toys, cartoons that make a child willing or that entice the child to eat	50	12.5
If yes, source of feeding stimulators information		
Health workers	23	5.8
Family members/friends	15	3.7
Media	6	1.5
Self-discovery	54	13.5
Feeding stimulators adopted while feeding your child with complementary food	**Yes Freq.(%)**	**No Freq.(%)**
Whenever I intend introducing complementary foods to my child, I throw toys at my child to gain his attention	103 (25.8)	297 (74.3)
I sing rhymes for my child while introducing complementary foods	265 (66.3)	135 (33.8)
I play video toy games for my child when I intend to give my child complementary foods	73 (18.3)	327 (81.7)

I crack my child up with jokes and smile whenever I intend to give him/her complementary foods	271(67.8)	129 (32.3)
Having other family kids around makes it easy for my child to accept the complementary food	180 (45.0)	220(55.0)
I read the body signs of my child before giving complementary foods	267 (66.8)	133 (33.3)
Do you consider you mechanism/tool effective	339 (84.8)	61 (15.2)
Do you think using feeding stimulators will improve your child's intake of complementary foods with time	294 (73.5)	106 (26.5)
Types of feeding stimulators that will improve your child's intake of complementary foods with time	**Yes Freq.(%)**	**No Freq.(%)**
Toys	237 (59.2)	163 (40.8)
Rhymes	314 (78.5)	86 (21.5)
Video toy games	186 (46.5)	214 (53.5)
Jokes	84 (21.0)	316 (79.0)
Other children around	61 (15.2)	339 (84.8)
Colorful utensils	114 (28.5)	286 (71.5)
Overall knowledge of nursing mothers on feeding stimulators	**Frequency**	**Percentage**
Good	173	43.2
Fair		

3.3 Nursing Mothers' Perception of Using Feeding Stimulators

Table 4 reveals the perception of nursing mothers on the use of feeding stimulators. The results show that 43.0% of the nursing mothers agreed that the use of feeding stimulators consumed more time, 57.1% and 18.0% agreed and strongly agreed respectively that the use of feeding stimulators such as toys, video games, colours, etc. would help children to learn useful skills required later for school achievement. Also, 23.5% of the nursing mothers agreed that feeding stimulator usage could have an adverse effect on the consumption pattern of the child while 58.8% and 12.8% of the respondents agreed and strongly agreed respectively that feeding stimulation at a young age improved mental scores and long-term cognitive ability.

On the other hand, 36.3% of the nursing mothers disagreed that using feeding stimulators leads to undernutrition among infants. Most (26.8%) of the nursing mothers disagreed that using feeding stimulators only affected mental and not motor development. Moreover, 31.3% of nursing mothers agreed that the use of feeding stimulators only improved child's language development, and 39.5% of the nursing mothers agreed that feeding stimulators would not allow the child to concentrate on feeding i.e. it will give room for divided attention.

Based on the mean values, the use of feeding stimulators such as toys, video games, colours, etc. would help children learn useful skills that would be required later for school achievement (3.78) was scored highest; followed by feeding stimulation at a young age improve mental and long term cognitive ability (3.66); and use of feeding stimulators consumes more time (3.10) were major perception of nursing mothers concerning feeding stimulators on intake of complementary food among infants.

Table 4. Perception of Nursing Mothers concerning the use of Feeding Stimulators

Statement	Disagree Freq(%)	Strongly Disagree Freq(%)	Neutral Freq(%)	Agree Freq(%)	Strongly Agree Freq(%)	Mean	Rank
Use of feeding stimulators consumes more time.	56(14.0)	75(18.8)	69(17.3)	172(43.0)	28(7.0)	3.10	3rd
Use of feeding stimulators such as toys, video games, colours etc. will help children learn useful skills that will be required later for school achievement.	24(6.0)	12(3.0)	64(16.0)	228(57.1)	72(18.0)	3.78	1st

Feeding stimulator usage could have adverse effect on consumption pattern of the child.	114(28.5)	57(14.3)	111(27.8)	94(23.5)	24(6.0)	2.63	6th
Feeding stimulation at a young age improve mental scores and long-term cognitive ability.	29(7.3)	11(2.8)	74(18.5)	235(58.8)	51(12.8)	3.66	2nd
Use of feeding stimulators leads to undernutrition among infants	145(36.3)	99(24.8)	92(23.0)	54(13.5)	10(2.5)	2.22	8th
Use of feeding stimulators only affects mental and not motor development.	107(26.8)	61(15.3)	135(50.8)	88(22.0)	9(2.3)	2.56	7th
Use of feeding stimulators only improve child's language development	94(23.5)	58(14.5)	102(25.6)	125(31.3)	21(5.3)	2.80	5th
Feeding stimulators will not allow the child to concentrate on feeding i.e. it will give room for divided attention	81(20.3)	51(12.8)	80(20.1)	158(39.5)	30(7.5)	3.01	4th

3.4 Relationship between knowledge of nursing mothers on feeding stimulators and food intake among children

The relationship between knowledge of nursing mothers on feeding stimulators and food intake among children is shown in Table 5. There was a very strong significant positive correlation (r = +0.962) between knowledge of nursing mothers on feeding stimulators and food intake among children (p = .00).

Table 5. Correlation between knowledge of nursing mothers on feeding stimulators and food intake among children. Note: Significant at p<0.05

		Knowledge	**Food intake**
Knowledge	Pearson Correlation	1	.962
	Sig. (2-tailed)		**.000**
	N	400	400
Food intake	Pearson Correlation	.962	1
	Sig. (2-tailed)	**.000**	
	N	400	400

3.5 Discussion

To ensure that children can reach their full developmental potential, breastfeeding mothers need to possess the necessary knowledge regarding ways to enhance their child's feeding experience. The findings of this study revealed that the average age of nursing mothers was similar to previous research, which reported an average maternal age of 27 years [20,21,22]. This suggests that nursing mothers were generally in their reproductive years. Furthermore, the study found that a substantial proportion of nursing mothers had received education, aligning with other studies that reported 60% of nursing mothers having secondary education and half of them having a high school education [21,23].

The study also indicated that more than half of the nursing mothers had a source of income that allowed them to afford essentials for themselves and their children before the arrival of their spouses. Additionally, a majority of the nursing mothers resided in urban areas, which contradicted another study's findings stating that 83.9% of nursing mothers lived in

rural areas, with only a few in urban areas [24]. The study further revealed that most nursing mothers had experienced multiparous pregnancies, consistent with previous findings indicating that 71% and 51% of nursing mothers had multiparous pregnancies [21,25]. Regarding the age of their infants, the study showed that the majority of nursing mothers reported their infants to be between 9-11 months old, with 22% indicating ages between 12-15 months and 21.3% specifying ages between 6-8 months. In contrast, another study found that 43.6% of respondents had infants aged between 12 to 18 months [26], indicating variation in infant age among the participants.

According to the latest guidelines for Infant and Young Child Feeding (IYCF), breastfeeding should be initiated within the initial hour after birth [3]. The results demonstrated that a significant portion (46.5%) of nursing mothers initiated breastfeeding within an hour after delivery, while others initiated it after longer intervals, ranging from more than an hour to several days. This finding was consistent with previous studies reporting a high percentage (80.6%) of nursing mothers initiating breastfeeding within one hour after delivery and generally indicating a satisfactory level of breastfeeding initiation [21, 27]. Notably, multiparous mothers were more likely to initiate breastfeeding promptly, as previously observed [21].

In terms of nursing mothers' knowledge about feeding stimulators, a substantial proportion indicated that they were unaware of what feeding stimulators entailed. This lack of awareness might be attributed to the use of terminology unfamiliar to them. Nevertheless, many nursing mothers admitted to using feeding stimulators, albeit unknowingly, during complementary feeding of their children, as seen in other studies [28]. Those who were aware of feeding stimulators reported acquiring this knowledge mainly through self-discovery, from health workers, while others learned from family members, and friends or via social media.

Regarding nursing mothers' perceptions of feeding stimulators, the study found that a higher number of them agreed that using feeding stimulators, such as toys, video games, and colors, could help children acquire valuable skills necessary for later academic success, with a high rating of 3.78. This was followed by the belief that feeding stimulation at a young age could improve mental scores and long-term cognitive abilities (rating of 3.66). Some nursing mothers expressed concerns that using feeding stimulators might consume more time (rating of 3.10). It is worth noting that stimulation, in this context, refers to devices or activities that enhance physiological and developmental aspects of a child, such as providing toys, colorful utensils, and interactive activities like singing, playing, or rhyming during feeding to enhance food intake [9]. Such stimulation plays a crucial role in both brain and body development, enhancing attention span, memory, and the nervous system, thereby accelerating developmental milestones [10]. Studies have also shown that interactive and stimulation activities result in positive feedback behaviours and developmental trajectories from children [29,30]. Therefore, Adequate nutrition, care, and stimulation are vital for a child's overall development and growth [8,31].

4. CONCLUSION

The study's findings suggest that the nursing mothers are typically in their reproductive years and exhibit a certain level of knowledge, linked to their educational background. A significant portion of these nursing mothers appeared to lack familiarity with the concept of feeding stimulators. This lack of awareness may be attributed to the use of terminology that might seem unfamiliar to them. Nevertheless, it was observed that most nursing mothers, in one way or another, employ feeding stimulators during the complementary feeding of their children. Among those who were aware of feeding stimulators, many acquired this knowledge primarily through self-discovery.

Regarding their perceptions, the study revealed that the majority of nursing mothers concurred on several points. They believed that the use of feeding stimulators such as toys, video games, and colorful items could facilitate children's acquisition of valuable skills essential for future academic success. Additionally, they believed that stimulating feeding at a young age could enhance children's mental abilities and long-term cognitive development. Some mothers expressed concerns that the use of feeding stimulators might extend mealtime, potentially diverting the child's focus away from eating. Furthermore, the study identified a robust and positive correlation between nursing mothers' knowledge of feeding stimulators and their children's food intake.

CONSENT

Written approval was obtained from the management of the primary health care centresand written informed consent was obtained from the participants after an explanation of the objectives and goals of the research had been provided.

ETHICAL APPROVAL

The ethics approval for theimplementation of this research was obtainedfromthe Ministry of Health, Oyo State, Nigeria

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